08/10/06 TFW 3727

Express Mail Label No. EV 874824528 US: I hereby certify that this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated below and is addressed to: Mail Stop Issue, Commissioner for Patents, P.O. Box 1450, Alexandria, VA. 22313-1450.

Date: August 8, 2006 By: Esther Miller
Esther Miller

Docket No: 110-24-003

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
David Murray Melrose

Serial No.: 09/689,957 Examiner: Smalley, James N.

Filed: October 12, 2000 Art Unit: 3727

For: A Container Having Pressure Responsive Panels

SUBMISSION OF PRIORITY DOCUMENT

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In compliance with 35 U.S.C. §119(b), Applicant submits herewith a certified copy of New Zealand application for Letters Patent number 334372 filed February 25, 1999, for the above-referenced application.

Respectfully submitted,

Dated: August 8, 2006

Anna M. Vradenburgh
Registration No. 39,868
Attorney for Applicant

Koppel, Patrick, & Heybl
Suite 107
555 St. Charles Drive
Thousand Oaks, California 91360
Telephone: (805)373-0060
Facsimile: (805)373-0051

Ministry of Economic Development
Manatū Ōhanga
Intellectual Property Office of New Zealand

CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 25 February 1999 with an application for Letters Patent number 334372 made by DAVID MURRAY MELROSE.

Dated 19 July 2006.

Neville Harris

Neville Harris
Commissioner of Patents, Trade Marks and Designs

COMMISSIONER OF PATENTS, TRADEMARKS & DESIGNS
NEW ZEALAND

CERTIFIED COPY OF PRIORITY DOCUMENT

334372

Patents Form No. 4

Our Ref: MH502500

Patents Act 1953

PROVISIONAL SPECIFICATION

VACUUM PRESSURE CONTAINER

I, **DAVID MURRAY MELROSE,** a citizen of New Zealand, of 90 Balmoral Road, Mt Eden, Auckland, New Zealand, do hereby declare this invention to be described in the following statement:

MH:VO:PT0472586

VACUUM PRESSURE CONTAINER

BACKGROUND OF THE INVENTION

This invention relates to a vacuum pressure container and more particularly to polyester containers capable of filling with hot liquid, and an improved sidewall construction for such containers.

'Hot-Fill' applications impose significant mechanical stress on a container structure. The thin sidewall construction of a conventional container deforms or collapses as the internal container pressure falls following capping because of the subsequent cooling of the liquid contents. Various methods have been devised to sustain such internal pressure change while maintaining a controlled configuration.

Generally, the polyester must be heat-treated to induce molecular changes resulting in a container that exhibits thermal stability. In addition, the structure of the container must be crafted to allow sections, or panels, to 'flex' inwardly to vent the internal vacuum and so prevent excess force being applied to the container structure. The amount of 'flex' available in each panel is limited, however, and as the limit is reached the force is transferred to the sidewall, and in particular the areas between the panels, of the container causing them to fail under any increased load.

The principal mode of failure in prior art containers is believed by the applicant to be non-recoverable buckling, due to weakness in the structural geometry of the container, when the weight of the container is lowered for commercial advantage. Many attempts to solve this problem have been directed to adding reinforcements to the container sidewall or to the panels themselves.

It is an object of one embodiment of the invention to overcome or at least obviate such problems or at least provide the public with a useful choice.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, a container for containing hot liquids includes in a sidewall thereof at least one panel adapted to invert and flex inwardly upon a lowering of internal pressure during cooling of the liquid in use.

Preferably, the present invention provides a thin-walled plastic container formed from a plastic or polyester material that is adapted to be capable of containing a liquid at a temperature elevated above room temperature. Preferably, the container includes a plurality of pressure or vacuum panels that are adapted to both invert and flex inwardly upon a lowering of internal pressure during cooling of the liquid.

Preferably, each vacuum absorption panel includes a projecting portion that is arcuate in an outwardly radial or transverse direction. Preferably, the projecting portion has at least one raised panel portion and at least one connecting portion which connects the raised portion to the peripheral edge of the vacuum panel. Preferably, an initiator portion controls the junction of the raised portion and the connecting portion.

Preferably, the connecting portion is capable of flexing inwardly under vacuum force, while the initiator portion causes the outwardly raised portion to both invert and then flex further inwardly. This causes far greater evacuation of volume from the vacuum panels than prior art. Vacuum pressure is subsequently reduced to a greater degree than prior art causing less stress to be applied to the container sidewalls.

Moreover, when the vacuum pressure is released following removal of the cap from the container, the panel is able to recover from its vacuum-set position and return to its original configuration. While under the effect of vacuum pressure the previously outwardly arcuate raised panel is set in an inwardly arcuate position. When the pressure is released the initiator portion causes the inwardly arcuate panel to successfully reverse direction transversely without being subject to non-recoverable buckling exhibited by prior art.

This increased venting of vacuum pressure provides advantageously for less force to be transmitted to the sidewalls of the container while capped. This allows for less material to be necessarily utilized in the container construction, making production cheaper. This also allows for less failure under load of the container and for less panel area to be necessarily deployed in the design of hot-fill containers. Consequently, this allows for the provision of other less efficient but more aesthetically pleasing designs to be employed in container design for hot-fill applications.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1: shows an elevational view of a container according to one possible embodiment of the present invention.

FIGURE 2A: shows a fragmentary front view of a panel section as shown in Figure 1.

FIGURE 2B: shows a fragmentary side view of a panel section as shown in Figure 1.

FIGURE 3: shows a fragmentary side view of a panel section inverted while under vacuum pressure.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to FIG 1, according to one aspect of the present invention the container is indicated generally at 1, as having a main sidewall portion 2 which may be of generally round cylindrical shape.

The container 1 is a 'hot-fill' container that is adapted to be filled with a liquid at a temperature above room temperature. The container may be formed in a blow mould and may be produced from a polyester or other plastic material, such as a heat set polyethylene terepthalate (PET). The sidewall portion 2 may include a plurality of vertically elongated oriented vacuum panels 3 which are disposed about the circumference of the container, which may be spaced apart from one another by smooth elongated vertically land areas 4. Each panel may be generally rectangular in shape and may be adapted to flex inwardly due to filling the container with a hot-fill liquid, capping the container, and subsequent cooling of the liquid. During the process the vacuum panels 3 of the container 1 may operate to compensate for the hot-fill vacuum.

Referring now to Figures 2a and 2b, the vacuum panel 3 may contain a projecting portion 5 that is arcuate in an outwardly radial or transverse direction, as indicated by direction arrow 6. The projecting portion may contain at least one connecting portion 7 that connects the raised portion to the peripheral edge of the vacuum panel. An initiator portion 8 may control the junction of the raised portion and the connecting portion.

The amount of arc of the initiator portion 8 may be significantly less than the arc of the raised portion 5, and may include an end 9 that is predominantly flattened and most susceptible to vacuum pressure. Thus when the container is subjected to vacuum pressure the vacuum panel may flex at initiator end portion 9 followed by inversion of the whole

334372

initiator portion 8 and subsequent continuation of inversion of the raised panel portion 5.

Figure 3 shows a panel section with the projecting portion inverted such that the panel is now in a position arcuate inwardly relative to its original direction.

Importantly, when the vacuum pressure is released following removal of the cap from the container, the panel is able to recover from its vacuum-set position and return to its original configuration due to the even gradation of arc curvature from one end of the projecting portion to the other. When the pressure is released the initiator portion causes the inwardly arcuate panel 10 to successfully reverse direction transversely, beginning with reversal of the initiator portion 11 and followed by the raised projecting portion 12 without being subject to non-recoverable buckling.

Where in the foregoing description, reference has been made to specific components or integers of the invention having known equivalents then such equivalents are herein incorporated as if individually set forth.

Although this invention has been described by way of example and with reference to possible embodiments thereof, it is to be understood that modifications or improvements may be made thereto without departing from the scope or spirit of the invention.

DAVID MURRAY MELROSE
By His Attorneys
BALDWIN SHELSTON WATERS

MH:VO:LAVA:SPEC:VACUUM PRESSURE CONTAINER
File Ref: MH502500-001

INTELLECTUAL PROPERTY OFFICE
OF N.Z.

25 FEB 1999

RECEIVED

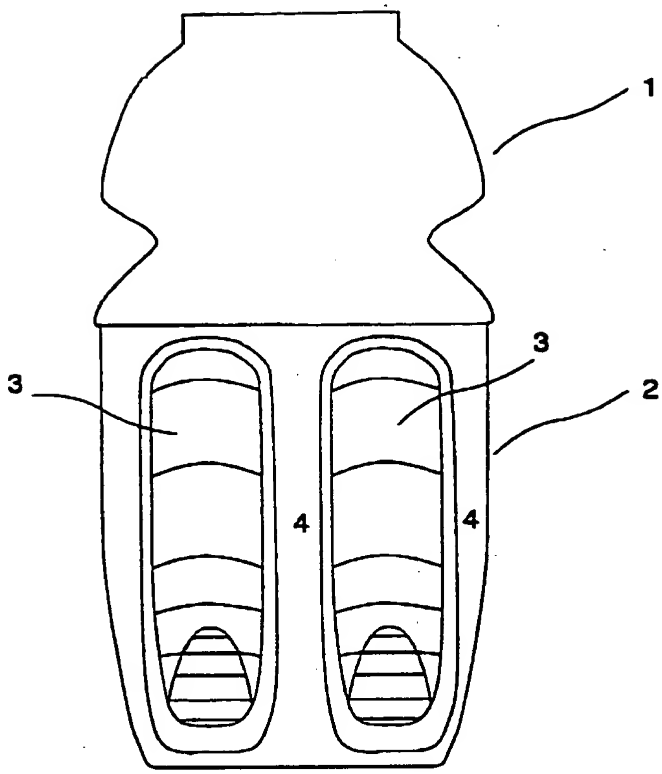

FIG 1

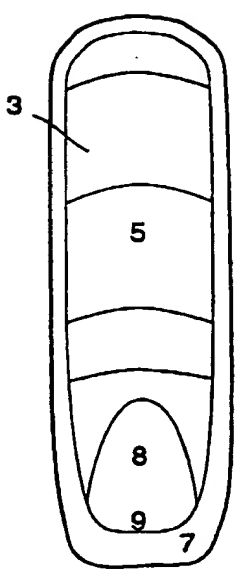

FIG 2a

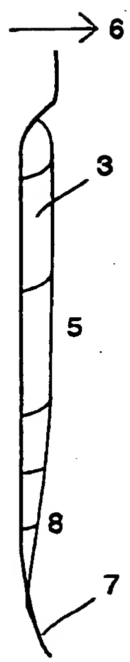

FIG 2b

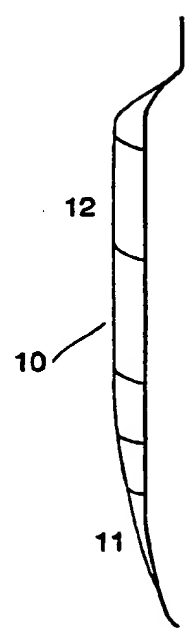

FIG 3